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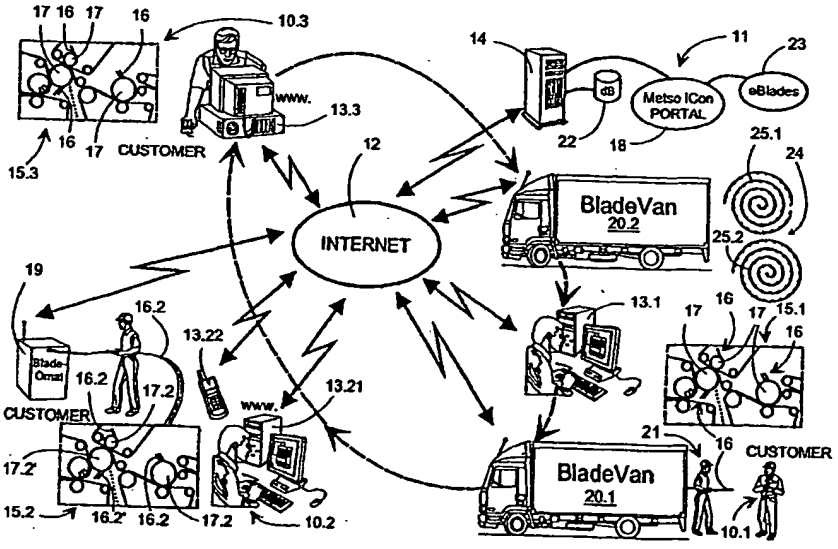

(57) Abstract: The invention concerns a delivery system for consumption and/or spare parts of machinery and equipment in the processing industries. In the system the following steps are carried out: - The supplier prepares the spare part as a blank, which is finished except for customer-specific characteristics. - The customer contacts the supplier's portal and places an order for a spare part. - The supplier registers the order and arranges for transportation of a spare part blank with a special vehicle, equipped to finish the spare part blank. - The supplier finishes the spare part blank in the vehicle and delivers it to the customer.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

DELIVERY SYSTEM FOR CONSUMPTION AND/OR SPARE PARTS

The invention concerns a delivery system for consumption and/or spare parts for machinery and equipment in the processing industries, wherein the parties are at least one customer using consumption and/or spare parts and at least one supplier of consumption and/or spare parts and wherein

- a need occurs at the customer's for purchasing at least one consumption and/or spare part,
- the customer specifies his need for the consumption and/or spare part,
- the customer sends to the supplier an order for the consumption and/or spare part he has specified,
- the supplier prepares and delivers the said consumption and/or spare part to the customer, and
- the customer receives the said consumption and/or spare part.

Examples of consumables used in machines of the processing industries are e.g. the blades used in doctor equipment, which are used to maintain the operating ability of paper or board machine rolls and which are thus located in an essentially important part in view of the machine's runnability. The doctor blades, of which there are usually between 50 and 60, depending on the machine concept, wear irregularly in the doctoring of rolls, thus causing an essentially poorer grip and in consequence an essentially poorer cleaning result.

Other examples of consumables relating to the processing industries branch are the coating rods used in coating equipment classified as finishing machines. With these rods, which may be grooved, the coating paste is spread out evenly e.g. on the roll surface, whence it is transferred further into the paper. The rod grooves will wear in use, whereby they must be replaced with new ones from time to time.

Examples of consumables in the stone crushing industry are e.g. the various meshes made of polyurethane and rubber. These must be replaced from time to time, not only due to wear and damage, but also when the screening result is to be changed.

Additional examples are the lubrication and cooling systems of machinery and equipment in the processing industries, as well as various analysers used by the industries, which contain filters that must be changed from time to time.

Only some examples were presented above of the numerous different consumption and spare parts of different types, which are needed in the processing industries. All things considered, their purchasing, inventorying and problems occurring in operation bind considerable resources of the factories and plants from their proper main business area and may even form bottlenecks in the production, if they do not function in the desired manner. On the other hand, even the processing industries aim at focusing on their customer relations and on their own central know-how, to which maintenance and service functions of equipment seldom belong. This has in fact made production plants reduce their staff from these functions and sometimes even entirely externalise their maintenance and service functions.

For example, in the case of doctor blades the customer, which hereinafter may mean e.g. a paper manufacturer, often finds the compulsory blade inventory to be a confused and difficult action. For example, storekeeping of blades may be arranged in a confused and decentralised manner in the factory area. Furthermore, there may be several different types of blade models, each one of which has a certain carefully defined position of its own, which is the only one where the blade in question fits e.g. as regards its model and manner of attachment. According to modern practice, blades are delivered to the factory in

boxes, which the customer then stocks on his premises in order to prevent running out of blades.

Ordering of blades must be known in advance in good time before running out of blades, because according to the state of the art the way in which blades are made and delivered takes a week on an average, which is a relatively long time, for example, in an emergency situation unexpectedly occurring at the customer's. The ordering process with all specifications relating to blade details will take the customer's time and is troublesome.

If the situation is really an emergency from the customer's point of view, when the customer runs out of e.g. a blade model of a certain type for some of the above-mentioned reasons, then it is demanded that the machine must be stopped in the worst case and significant losses of production will often result due to unreasonably long delivery times of new blades. If required, the blade delivery may be speeded up as the customer's order bypasses the supplier's current order and production queue, but in this case the customer will then incur correspondingly higher costs.

Furthermore, the customer may arise an interest to test run in his own machine environment a new type of blade launched on the market. However, arranging a test run takes an unreasonably long time due, among other things, to the mentioned disadvantageously long delivery times of blades.

Due to the degree of finishing of doctor blades being advanced even at the manufacturing stage they are subject to cost pressures, which from the customer's point of view emerge as a high price of doctor blades. The availability of information relating to doctor blades is difficult, partly due to the distant relationship between their supplier and the customer. Blade information does not always necessarily exist, because of the

customer's and supplier's mutual poor knowledge of one another and because the blade supplier is not necessarily even the customer's actual machine supplier. In such a situation, the blade supplier has no knowledge of the customer's precise machine concept and of any relating compatibility problems. Nor is the supplier aware of the habitual use of the customer's consumption and spare parts and e.g. of the average useful life of blades, which may indicate this subconscious problem at the customer's.

At the present time blades are made at traditional blade workshops including riveting machines as well as complete cutting and bevelling equipment along with blade packaging equipment. The blades are made (for example, cut according to the location position) into their final shape according to specifications given by the customer.

The solution presented in patent application FI-980514 is further referred to as the state of the art, which solution has special equipment for cutting off doctor blades into the desired blade length. In this equipment the customer must further take inventory e.g. of the consumption of blades, and based on this he must take steps to supplement his blade reserve.

Reference is also made to patent application FI-20002830 as the state of the art. It presents a method, wherein ready-made doctor blades are stocked at a paper factory and the number of used blades is monitored. Information on the number of doctor blades is relayed further to the blade supplier's data management system in such a way that the supplier is able to maintain the desired number of blades at the factory. It is a problem with this solution that the customer still has to keep in store quite a lot of various doctor blades in order to make sure that he will always have such doctor blades available, which will be suitable for every individual application. Naturally, this binds capital in unproductive storekeeping.

It is a purpose of the present invention to bring about a system of a new kind avoiding the above-mentioned drawbacks and faults and which can be used to carry out steps relating to consumption and spare parts, such as their delivery and distribution of information and know-how concerning them, considerably faster, more efficiently and comprehensively than before. The characteristic features of the system according to the invention are listed in claim 1.

It is a characteristic feature of the system according to the invention that the customer can attend easily and efficiently to steps relating to e.g. the purchasing of consumption and spare parts, to information acquisition and to problem solving through a special consumption and spare parts portal arranged in a data network from a single site, which provides a purposeful way of ordering the concerned parts, of arranging the related training, of problem-solving and virtual monitoring. Through the data network the supplier of consumption and spare parts is able in a much shorter time and with higher cost efficiency to provide know-how and also to deliver to the customer the consumption and spare parts he has ordered, which will benefit both the customer party and the supplier party.

The system according to the invention can be advantageously applied to such consumption and spare parts, which can be finished by simple acts from a ready-made blank at the customer's place into a product specified for the customer's machine concept. The selection of parts becomes simpler and is reduced essentially from the known selection. One such consumable is the doctor blade, because these can be prepared beforehand as blanks, from which object-specific blades can be made. This is made possible by the manner in which blades are attached, which can advantageously be formed to be almost independent of the blade holder.

According to an advantageous embodiment, the ready-made consumption and/or spare part blanks may be arranged in a special vehicle making possible the supplier to move freely e.g. from one customer to another and finishing of the parts at the customer's place at the place where they will be used. This allows an especially smooth delivery of consumption and spare parts compared with the state of the art. The doctor blade is again a good example of a consumable for the delivery of which the system according to the present invention can be advantageously utilised.

According to another advantageous embodiment, a special automaton can be arranged at the customer's place, which automaton is programmed to finish customer-specific parts from ready-made consumption or spare part blanks.

Essential in the system according to the invention is the connection of the customer's special consumption and spare parts vehicle and consumption and spare parts automaton by way of a data network with the supplier's data system, wherein e.g. the customer's orders and inquiries are registered, and information relating to the sales of consumption and/or spare parts is transferred through the data network and stored therein. With the said information the supplier can monitor the customer's process, make analyses concerning consumption and spare parts and use the information e.g. in simulations, with which new information can be formed advantageously and new solutions can be developed for the said consumption and spare parts.

The customer achieves several significant advantages with the system according to the invention. For example, in the case of doctor blades, blade costs are reduced and the need for inventorying is essentially reduced. In one application of the invention, the customer avoids all costs of keeping blades in stock and he pays for the blade only when putting it into use.

Emergency deliveries become more accurate and the blade testing done at the factory becomes much easier than before.

To the supplier this invention offers advantages, among other things, essentially improved and easier communications with every customer, irrespective of the customer's size or the extent of his business operations. In addition to the simplified process for making consumption and spare parts, the system allows prompt reactions to the customer's demands and requests. As the final result, the system brings about significant advantages both for the customer and for the supplier. Other features characteristics of the invention emerge from the appended claims and from the specification part.

In the following, the invention will be described in greater detail with the aid of examples and with reference to the appended drawings, wherein

Figure 1 is a schematic view of the parties to the delivery system for consumption and spare parts according to the invention applied to the papermaking industry,

Figure 2 shows an example of a blade clamp making possible the doctor blade delivery system according to the invention,

Figures 3a, b and c show use of the blade clamp of Figure 2 in different blade holders,

Figure 4 shows another example of a blade clamp making possible the doctor blade delivery system according to the invention, and

Figures 5a, b and c show use of the blade clamp of Figure 4 in different blade holders.

Figure 1 is a schematic view of an application example embodying the delivery system for consumption and spare parts according to the invention. The figure shows the parties to the system, who are the customer 10.1, 10.2, 10.3, the supplier 11

of consumption and spare parts, and the construction of protected data communication connections for these by way of a data network 12.

The data network for use in data transmission may advantageously be, for example, an Internet network 12, wherein the setting up of connections between the terminal equipment 13.1, 13.21, 13.22, 13.3 of customers 10.1, 10.2, 10.3 and the supplier's 11 server machine 14 takes place according to technology known as such and this will not be described further in this context. The terminal equipment used may be e.g. a computer 13.1, 13.21, 13.3 or a mobile station 13.22, a hand-held computer or some other terminal equipment allowing direct (with the http protocol) or indirect (e.g. with a mobile station or the WAP protocol) communication in the said data network 12.

The said customer 10.1, 10.2, 10.3 may be, for example, a paper or board maker, a surface finisher or a pulp maker. The supplier 11 may be, for example, supplier of paper, board, surface finishing or pulp machines or a manufacturer or possibly a distributor of consumption and spare parts for the machines in question.

As a possible advantageous form of application the system according to the invention may be used e.g. for the doctor blades 16, 16.2, which are to be presented in the following application example and which form a significant part of the consumables of e.g. a papermaking machine 15.1, 15.2, 15.3. Figure 1 shows the press section of a papermaking machine 15.1, 15.2, 15.3, wherein the said doctor blades 16, 16.2 have a role significant to the runnability of the machine in the cleaning and servicing of rolls 17, 17.2, 17.2'. Besides the press section, many blades are used e.g. in the drying section. However, application of the system according to the invention is suitable not only with doctor blades 16, 16.2, but also with numerous other consumption and spare parts, such as, for exam-

ple, for spreading rods of coating equipment, for meshes used in stone crushers etc.

The system according to the invention consists mainly of four different elements. An essential part is the Metso iCon consumption and spare parts portal 18, which is operated through the Internet network 12 and maintained by a server machine 14. The portal complex 18 includes as sub-modules, for example, a service entity applet (eBlades) 23 providing a pleasant, easy and economic way of purchasing blades 16, 16.2. The entity further includes an automatic dispenser (BladeOmat) 19 of doctor blades 16.2 which can be located e.g. near the papermaking machine 15.2. The fourth element is a special blade vehicle (BladeVan) 20.1, 20.2, which is e.g. a mobile blade-finishing workshop driven by a blade specialist 21.

In the delivery system according to the invention, the special Metso iCon www portal 18 has an essential part which is available through data network 12, to which the customer 10.1, 10.2, 10.3 may transfer with his terminal equipment 13.1, 13.21, 13.22, 13.3 to find out solutions to his own doctor blade requirements. The said www portal 18 is located e.g. on a server machine 14 administered and/or maintained by the doctor blade supplier 11. For example, a customer and order database dB 22 and extensive document libraries in electronic format, for example, of product, reference and other information readable by the customers 10.1, 10.2, 10.3 are also arranged on the server machine 14.

The Metso eBlades applet tool 23 arranged at portal 18 provides doctor blade customers 10.1, 10.2, 10.3 with all-inclusive service, for example, for ordering blades 16, 16.2 in a pleasant and cost efficient manner. The eBlades tool 23 guides the customer 10.3 according to his choice, for example, in the acquisition of a new blade 16.

The eBlades tool 23 includes a sales configurator guiding the customer 10.1, 10.2, 10.3 through the purchasing process to a final result, which is successful and instructive from the customer's point of view. The blade delivery can be chosen to take place, for example, with the said BladeVan 20.1, 20.2 or from BladeOmat 19, which the customer 10.1, 10.2, 10.3 can order to his papermaking machine 15.1, 15.2, 15.4 through the said www portal 18.

The eBlades tool 23 is also designed to help the customer in problematic situations relating to blades, and a virtual blade specialist (not shown) is arranged together with it as a problem-solving applet, which will solve doctoring problems occurring at the customer's 10.1. The customer 10,1 answers the questions made by the blade specialist, and from these answers the specialist automatically forms a preliminary problem-solving proposal, based on which the customer 10.1 and the supplier 11 may begin solving the problem. If required, the sales configurator may be supported by interactive software based on fuzzy deduction, which makes it easier to identify qualitative customer expectations and to find the optimum solution to these.

In the training applet of the eBlades tool 23, the customer may also control a virtual doctor, which may be used to simulate different doctoring situations and doctor models easily and realistically.

Furthermore, a reference library arranged in connection with the eBlades tool 23 helps in selecting the blade material best suited for the application, and newsletters present new products recently arrived in the market etc. Through the portal 18 it is also possible to order the doctor blade specialist 21, doctor service or a test run of new blades etc. for the papermaking machine 15.1, 15.2, 15.3. The portal 18 is designed to

be pleasant and easy to use and its use is made very instructive.

For the technical implementation of the portal 18 and sub-modules 23 linked to it there are numerous known ways, and their implementation will not be described in greater detail herein.

According to the system of the invention, the doctor blades 16 are made in their manufacturing step at supplier's 11 blade workshop 24 as ready-made blanks 25.1, 25.2 only lacking their customer-specific characteristics, and the blanks can be advantageously finished with minor and simple steps into a blade 16, 16.2 for each customer 10.1, 10.2, 10.3 specified according to his machine concept 15.1, 15.2, 15.3.

The steps of blade 16, 16.2 manufacture consist, for example, of bevelling of the blade 16, 16.2 tip and of cutting off of the blade strip into lengths of a certain size, for example, 150 metres. The application form is made possible by a new type of blade 16, 16.2 clamp arrangement, wherein the blade strips are perforated e.g. at equal intervals at a distance of 36 inches from each other from the side opposite to their bevel side, and special clamps independent of the blade holder are placed in them, which clamps are almost as a universal solution independent of the model of blade holder being used. Examples of the said universal clamps will be presented later in the specification referring to Figures 2 - 5a, b, c.

Next, the operation of the system according to the invention will be described in the case of the said doctor blades 16, 16.2 and relying on Figure 1. As they are consumption and spare parts, the doctor blades 16, 16.2 must be replaced with new ones from time to time and at more or less regular intervals. Problems demanding e.g. service steps may also occur in them and often the customer 10.1, 10.2, 10.3 lacks resources for solving the problems. Hereby the customer 10.1, 10.2, 10.3

places a blade order or notifies the supplier 11 of the problems relating to blades to the Metso iCon www portal 18 run by the server machine 14.

The supplier 11 registers on his server machine 14 the customer's 10.1, 10.2, 10.3 order and what he has reported. The blade and/or specialist order is entered in the database dB 22 maintained at the server machine 14 and it is relayed further immediately, for example, to the blade workshop 24 or to the dispatching department or to the blade specialist 21, and here the steps required by the order will be taken forthwith.

At the blade workshop 24 the blade blanks 25.1, 25.2 may be made with a very high degree of completion and packed e.g. in coils. This for its part makes possible a quick and efficient reaction to execute the customer's 10.1, 10.2, 10.3 order.

In an embodiment of the invention, the doctor blade 16 supplier 11 has one or more special vehicles (BladeVan) 20.1, 20.2, which may be run, for example, by the said blade specialist 21. The ready-made and pre-riveted blade blanks 25.1, 25.2 are arranged in the BladeVan 20.1, 20.2 e.g. at the blade blank workshop 24. In the case shown in the application example, BladeVan 20.1, 20.2 is equipped with means (not shown) for finishing the doctor blades 16, which include e.g. a set of means needed for mounting the said blade clamps together with equipment for cutting off the blade 16 to a certain size. Thus, the blade specialist 21 may drive the BladeVan 20.1, 20.2 to the place where the blades 16 are used, which allows an especially smooth delivery of blades 16 compared with the known technique (the route is indicated by a dashed arrow line). The most advantageous operating radius of the BladeVan 20.1, 20.2 is 400 km, which makes possible a delivery of blades within approximately 5 hours. Besides the blade delivery, the customer 10.1, 10.2, 10.3 at the same time gets from the BladeVan 20.1, 20.2 full services of the blade specialist 21 in possible

problematic situations and also the possibility of a smooth test run, should he so desire.

The location of BladeVan 20.1, 20.2 can be followed with the aid of a GPS signal. This makes it possible to optimise the route of the vehicle 20.1, 20.2 according to the current need of customer situation and to give to the customer 10.1, 10.2, 10.3 also an accurate prognosis of when the blade specialist 21 will be at the factory with his vehicle 20.1, 20.2. The GPS can also be utilised to guide the specialist 21 to the factory along the route taking the shortest time.

Finishing of the blades 16 from the BladeVan 20.1, 20.2 is arranged to take place in such a way that each customer 10.1, 10.2, 10.3 has his own order number, which is entered into the finishing equipment of BladeVan 20.1, 20.2, which finishing equipment may preferably be of a corresponding kind as the automatic blade dispenser 19, which will be presented hereinafter. Information emerging from the order number is such as the customer's 10.1 production plant, machine 15.1 and the position, for which the finishing equipment makes a suitable blade 16. The order number is preferably in bar code form, whereby it is easily read by a bar code reader.

According to another advantageous embodiment of the invention, the supplier 11 of blades 16.2 may arrange a special blade automaton (BladeOmat) 19 for the customer 10.2, which automaton functions as a special automatic vending machine for blades 16.2, 16.2'. The customer 10.2 can perform supplementing of the BladeOmat's 19 blade reserve e.g. by using a mobile station terminal 13.22 or through the Internet 12 by way of the Metso iCon www portal 18. In his order the customer 10.2 states, for example, the blade type and length he needs, which is determined by the customer's 10.2 machine concept 15.2. According to the specified blade length, supplier 11 makes a pre-riveted blade blank, which he delivers to the place were the blades

16.2, 16.2′ are used as supplement to the BladeOmat 19, for example, the doctor blade specialist 21 maintaining the local BladeOmat 19 from the stock of pre-riveted blades in his Blade-Van 20.1 or in some other suitable mode of transportation.

In a third advantageous form of application, data communication connections are arranged in the BladeOmat 19 to relay information to the supplier 11 on the customer's 10.2 blade events by way of the data network 12. BladeOmat 19 may send a possible request for supplementing of the blade reserve to supplier 11 through the data network 12 directly, so that the customer 10.2 need not attend to this separately.

BladeOmat 19 can be programmed on a customer-specific basis, whereby information relating to the customer's machine concept 15.2 can be placed therein, such as the widths and doctor positions of the rolls 17.2, 17.2′ to be doctored, whereby it makes possible in a similar manner as the BladeVan finishing of the blade 16.2, 16.2′ from a ready-made blank according to the customer-specific characteristics. BladeOmat 19 may also be connected through the data network 12 with supplier's 11 database dB 22, which contains the latest knowledge of doctors and of their suitability for different applications. BladeOmat 19 may hereby choose the blade blank best suited for the chosen application from those placed in its stock, for example, blanks made of a few different material compositions. It is sufficient for the customer 10.2 to specify only the papermaking machine 15.2 and the desired doctor position in the machine concerned, and the automaton 19 will take care of the rest.

BladeOmat 19 uncoils and cuts off the requested pre-riveted blade 16.2, while the customer 10.2 need only add possible end rivets to the blade 16.2, whereupon the blade 16.2 is ready for putting into use. BladeOmat 19 can preferably be used together with a so-called BladeFeed system, which is used to feed the

blade automatically into its holder (the applicant's patent application FI-20015006).

Naturally, BladeOmat 19 may also be equipped with blades 16.2, 16.2' made ready for different positions of the papermaking machine 15.2, so that it need not itself do any necessary finishing work. However, all advantages of the invention are not then realised to their full extent. For example, the supplier 11 must keep quite a large stock of doctor blades in order to make sure that he will be able to provide all BladeOmat automatons 19 with the different blades needed by the customers.

The customer 10.1, 10.2, 10.3, the BladeOmat 19 blade automaton and the BladeVan blade vehicle 20.1, 20.2 are preferably in connection through a data network 12 with a data system arranged at the supplier's 11 server machine 14 and with control of the manufacture of blade blanks 25.1, 25.2. E.g. information relating to the consumption of blades 16, 16.2 is registered in the data system and this information is utilised, for example, in correlation analyses, where it is possible e.g. to study the blade consumption of each individual machine as well as the effect of different run or concept parameters on the blade's 16, 16.2 behaviour. The gathered information may also be used in simulations, which can advantageously be used for enlarging the blade information and for developing new and constantly better blade solutions.

The excessive smoothness of the middle roll 17.2' in the press section of a customer's 10.2 papermaking machine 15.2 emerging as reduced wear of the blade 16.2' is shown as an example of problems which can be found when observing blade consumption. If blade 16.2' wears too quickly, then runnability problems may occur. Thus, the method according to the invention allows good alarms and analyses both in the case of blade 16.2' wear and also in the case of non-wear.

Figures 2 and 4 show the entirely new kind of clamp 30, 31 for the doctor blade 16, 16.2, 16.2' making possible the system according to the invention and the operation of e.g. BladeVan 20.1, 20.2 and BladeOmat 19. This universal clamp 30, 31 may according to an advantageous embodiment be the simple rivet 30 shown in Figure 2, which reduces the number of necessary blade types to three. Of these two may cover 98 % of the doctors in use. Rivet 30 allows universal compatibility with almost all doctor blade holders 34 in use. Figures 3a, 3b and 3c show examples of the said blade holders 34 in the case of rivet 30.

Figure 3a shows a fixed type of blade holder 34 and Figures 3b and 3c show blade holders 34 loaded by a hose 35. In these a rivet 30 arranged in the blade part 39 is placed in groove 33 in the blade holder 34, and when blade part 39 is loaded against the rotating roll it cannot slip out of the groove, because the rivet 30 fit is made accurate as regards both its place and height.

Instead of the rivet 30 shown in Figure 2, a flexible means, clips 31, of the kind attached on opposite sides of the blade part 39, may be used as another advantageous universal blade 16, 16.2 clamp.

Clip 31 is formed e.g. by a metal strip 32, to which a flexible tongue 37 is bent, and further by a barb 38 bent to the end of tongue 37. There are holes 36 in the metal strip 32 for its attachment, for example, with rivets (not shown) to the blade part 39.

In the case of clips 31 two holes are drilled into the blade part 39, from which holes clips 31 placed on opposite sides of blade part 39 are attached by rivets (not shown). In the case of the fixed blade holder 34 shown in Figure 5a, clips 31.1, 31.2 are not matching exactly, but e.g. the clip 31.1 located above the blade part 39 is located essentially at the threshold

40 of blade holder 34 and the clip 31.2 located below is located in the groove 33 of the blade holder. In the blade holders 34 shown in Figures 5b and 5c, both clips 31 are attached essentially in the same holes of the blade part 39, but their tongues 38 are pointing in different directions in such a way that the tongue 38 of the clip 31 located under blade part 39 points in the direction of the bevelled side of blade part 34 and the tongue 38 of clip 31 located above points in the direction of the side opposite to the bevelled side of blade part 39.

In the system according to the invention, an invoicing system is preferably linked to a consumption and/or spare parts automaton or vehicle, such as the BladeOmat 19 and BladeVan 20.1, 20.2 according to the doctor blade example described above. The consumption and/or spare parts automaton may preferably be arranged with the customer 10.2 under a leasing agreement, whereby the customer will only pay for the consumption and/or spare parts he uses.

The delivery system according to the invention is suitable not only for the application example presented above, which describes delivery of doctor blades, but also for e.g. delivery of coating rods of coating equipment classified as finishing machines and of consumables of the rock crushing industry, such as various meshes made of polyurethane and rubber.

Still other examples of consumption and spare parts, which can be advantageously delivered to the customer by utilising the system according to the invention, are lubrication and cooling systems of machines and equipment in the processing industries, as well as various analysers used by the industries and containing filters that must be replaced from time to time, and generally spare components necessary in the control and adjustment of machines and equipment and the whole process in the processing industries. Such are, for example, replaceable

cards, which can replace a failed circuit either as such or configured.

More and more often the supplier sells reliable operation to his customer instead of the traditional consumption and spare parts. Thus, the price obtained by the supplier is not determined by how many such parts he delivers, but by how well the supplier is able to keep the customer's machine or process in operation. Thus, in the doctor blade case described as an example the supplier no longer necessarily sells separate blades, but what he sells is doctoring ability under an agreement. The agreement may also include training provided by the supplier as well as consultancy in problematic situations, for example, by utilising a portal developed for this purpose. The present invention provides the supplier with a new advantageous way of implementing this new operational model. The supplier can in a cost efficient way make sure that the correct consumption or spare part is always available to the customer and that the customer can also have a specialist visit his premises promptly when required. The supplier collects information on the sales of consumption and spare parts under different circumstances. This information he may use later both in developing new machine solutions and in pricing the service he offers.

It should be understood that the above description and the figures relating to it are intended only to illustrate the present invention. Thus, the invention is not limited only to the embodiments presented above or defined in the claims, but many such different variations, modifications and applications will be obvious to the professional in the field, which are possible within the scope of the inventive idea defined in the appended claims.

CLAIMS

1. Delivery system for consumption and/or spare parts (16) of machinery and equipment in the processing industries and including as parties at least one customer (10.1) using consumption and/or spare parts (16) and at least one supplier (11) of consumption and/or spare parts (16) and wherein

- a need occurs at the customer's (10.1) for purchasing at least one consumption and/or spare part (16),
- the customer (10.1) specifies his need for a consumption and/or spare part,
- the customer (10.1) sends to the supplier (11) an order for the consumption and/or spare part (16) he has specified,
- the supplier (11) prepares and delivers the said consumption and/or spare part (16) to the customer (10.1), and
- the customer (10.1) receives the said consumption and/or spare part (16),

characterised in that the supplier (11) of consumption and/or spare parts (16) has a special vehicle (20.1), wherein means are arranged for finishing consumption and/or spare parts (16), as well as a server machine (14), which is connected to a data network (12) and wherein is located a special consumption and/or spare parts portal (18), and the said customer (10.1) has terminal equipment (13.1) connected to the said data network (12), and wherein the following steps are carried out

- the supplier (11) prepares beforehand the said consumption and/or spare part as a blank (25.1), which is finished except for customer-specific characteristics, and arranges for transportation and finishing of the consumption and/or spare part blank (25.1) in the vehicle (20.1),
- the customer (10.1) contacts the server machine's (14) consumption and/or spare parts portal (18) with his terminal equipment (13.1),

- the customer (10.1) specifies his need for a consumption and/or spare part in the portal (18) and places his order,
- the supplier (11) registers the customer's (10.1) need for a consumption and/or spare part, and
- the supplier (11) moves to the customer's (10.1) premises with the said vehicle (20.1) bringing with him the said consumption and/or spare part blank (25.1), and
- the supplier (11) finishes the said customer-specific consumption and/or spare part (16) from the said consumption and/or spare part blank (25.1) and makes it over to the customer (10.1).

2. System according to claim 1, characterised in that the said vehicle (20.1) is preferably arranged to send consumption and spare parts information over a data communication link through the said data network (12) to the supplier's (11) data system dB (22) e.g. in order to monitor sales of consumption and spare parts (16) and/or to arrange invoicing and/or to utilise process analysing and simulation environments, where it is used e.g. for developing the characteristics of consumption and/or spare parts (16) and for developing equipment concepts.

3. System according to claim 2, characterised in that it is possible for the supplier (11) to make proposals to the customer (10.1) through the said data network (12) for alternative consumption and/or spare parts (16) based on the received consumption and/or spare parts information and for development of closely related process applications.

4. System according to any claim 1 - 3, characterised in that the said vehicle (20.1) is equipped with positioning means in order to determine the said vehicle's (20.1) location at each time.

5. System according to any claim 1 - 4, characterised in that in the vehicle (20.1) a place is arranged for a special consumption and/or spare parts specialist (21).

6. System according to any claim 1 - 5, characterised in that the portal (18) arranged at the said server machine (14) includes as sub-modules an applet (23) for ordering consumption and/or spare parts (16), a virtual instruction and problem-solving applet and/or a document library, among other things.

7. System according to any claim 1 - 6, wherein the said consumption and/or spare parts are doctor blades (16, 16.2), characterised in that in the supplier's (11) said vehicle (20.1) means are arranged for finishing doctor blades (16, 16.2, 16.2') from at least one doctor blade blank (25.1).

8. System according to claim 7, characterised in that in the step of making the said doctor blade blank (25.1) perforation is done in it, wherein clamping means (30, 31) are fitted to attach the doctor blade (16) in the doctor blade holder (34) in its place of application, and packaging.

9. System according to claim 8, characterised in that the said blank (25.1) is packaged in a coil.

10. System according to claim 8 or 9, characterised in that a special rivet (30) is used as the said clamp and it is adapted to be independent of the blade holder (34) model.

11. System according to claim 8 or 9, characterised in that a special flexible means (31) is used as the said clamp and it is adapted to be independent of the blade holder (34) model.

12. Delivery system for consumption and/or spare parts (16) of machinery and equipment in the processing industries and including as parties at least one customer (10.1) using consump-

tion and/or spare parts (16) and at least one supplier (11) of consumption and/or spare parts (16), and wherein

- a need occurs at the customer's (10.1) for purchasing at least one consumption and/or spare part (16),
- the customer (10.1) specifies his need for a consumption and/or spare part,
- the customer (10.1) sends to the supplier (11) an order for the consumption and/or spare part (16) he has specified,
- the supplier (11) prepares and delivers the said consumption and/or spare part (16) to the customer (10.1), and
- the customer (10.1) receives the said consumption and/or spare part (16),

characterised in that the supplier (11) of consumption and/or spare parts (16) has a server machine (14), which is connected to a data network (12) and wherein a special consumption and/or spare parts portal (18) is located, and the said customer (10.1) has terminal equipment (13.1) connected to the said data network (12) and a special piece of equipment (19) arranged by the supplier (11), wherein means are arranged for finishing consumption and/or spare parts (16), and wherein the following steps are carried out

- the supplier (11) prepares beforehand the said consumption and/or spare part as a blank (25.1), which is finished except for customer-specific characteristics,
- the customer (10.1) contacts the server machine's (14) consumption and/or spare parts portal (18) with his terminal equipment (13.1),
- the customer (10.1) specifies his need for a consumption and/or spare part in the portal (18) and places his order,
- the supplier (11) registers the customer's (10.1) need for a consumption and/or spare part,

- the supplier (11) delivers the said consumption and/or spare part blank (25.1) to the customer (10.1) for the said piece of equipment (19), and
- the customer (10.1) finishes according to need from the said consumption and/or spare part blank (25.1) the said customer-specific consumption and/or spare part (16) and puts it into operation.

13. System according to claim 12, characterised in that the said piece of equipment (19) is preferably arranged to send consumption and spare parts information over a data communication link through the said data network (12) to the supplier's (12) data system dB (22) e.g. in order to monitor sales of consumption and spare parts (16) and/or to arrange invoicing and/or to utilise process analysing and simulation environments, where it is used e.g. for developing the characteristics of consumption and/or spare parts (16) and for developing equipment concepts.

14. System according to claim 12 or 13, characterised in that the portal (18) arranged at the said server machine (14) includes as sub-modules an applet (23) for ordering consumption and/or spare parts (16), a virtual instruction and problem-solving applet and/or a document library, among other things.

15. System according to any claim 12 - 14, characterised in that it is possible for the supplier (11) to make proposals to the customer (10.1) through the said data network (12) for alternative consumption and/or spare parts (16) based on the received consumption and/or spare parts information and for development of closely related process applications.

16. System according to any claim 12 - 15, characterised in that the consumption and spare parts equipment (19) is programmed to choose the required part (16) based on the information given to it.

17. System according to claims 12 - 16, wherein the said consumption and/or spare parts are doctor blades (16, 16.2, 16.2'), characterised in that in the piece of equipment (19) arranged by the supplier (11) at the said customer's (10.1) means are arranged for finishing doctor blades (16, 16.2, 16.2') from at least one doctor blade blank (25.1).

18. System according to claim 17, characterised in that in the step of making the said doctor blade blank (25.1) perforation is done in it, wherein clamping means (30, 31) are fitted to attach the doctor blade (16) in the doctor blade holder (34) in its place of application, and packaging.

19. System according to claim 18, characterised in that the said blank (25.1) is packaged in a coil.

20. System according to claims 18 - 19, characterised in that a special rivet (30) is used as the said clamp and it is adapted to be independent of the blade holder (34) model.

21. System according to claims 18 - 19, characterised in that a special flexible means (31) is used as the said clamp and it is adapted to be independent of the blade holder (34) model.

22. Delivery system for consumption and/or spare parts (16) of machinery and equipment in the processing industries and including as parties at least one customer (10.1) using consumption and/or spare parts (16) and at least one supplier (11) of consumption and/or spare parts (16), and wherein

- a need occurs at the customer's (10.1) for purchasing at least one consumption and/or spare part (16),
- the customer (10.1) specifies his need for a consumption and/or spare part,
- the customer (10.1) sends to the supplier (11) an order for the consumption and/or spare part (16) he has specified,

- the supplier (11) prepares and delivers the said consumption and/or spare part (16) to the customer (10.1), and
- the customer (10.1) receives the said consumption and/or spare part (16),

characterised in that the supplier (11) of consumption and/or spare parts (16) has a server machine (14), which is connected to a data network (12) and wherein a special consumption and/or spare parts portal (18) is located, and the said customer (10.1) has terminal equipment (13.1) connected to the said data network (12) and a special piece of equipment (19) arranged by the supplier (11), wherein the supplier may stock consumption and/or spare parts and from which the said customer (10.1) may cash in them, and wherein the following steps are carried out

- the customer (10.1) contacts the server machine's (14) consumption and/or spare parts portal (18) with his terminal equipment (13.1),
- the customer (10.1) specifies his need for consumption and/or spare parts in the portal (18),
- the supplier (11) registers the customer's (10.1) need for consumption and/or spare parts,
- the supplier (11) makes the said consumption and/or spare part according to the customer-specific characteristics and delivers it to the said customer (10.1) for the said piece of equipment (19),
- the customer (10.1) receives the said customer-specific consumption and/or spare part (16) to use it, and
- the piece of equipment (19) registers the consumption and/or spare part put into use by the customer (11).

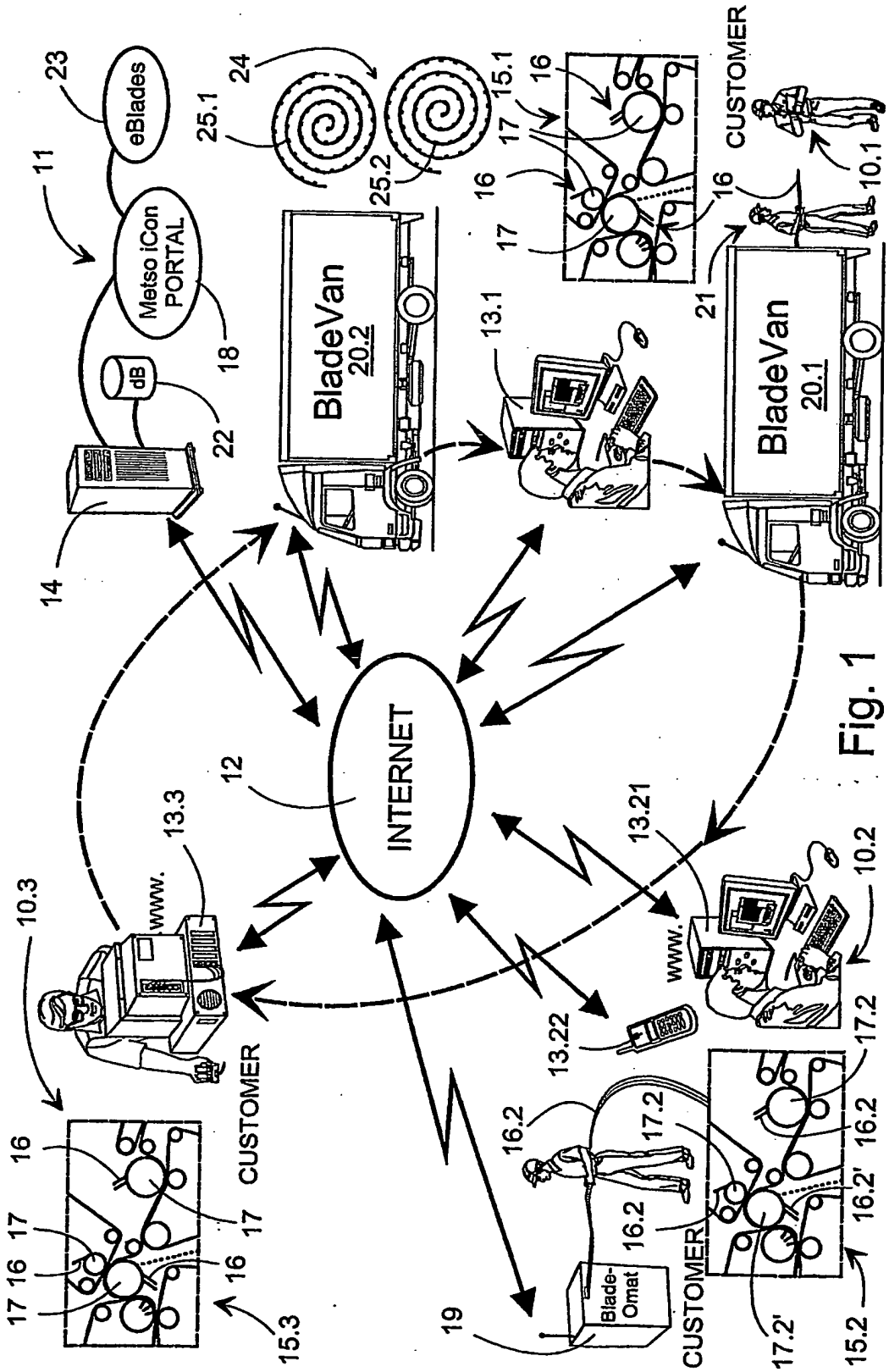
eBlades
Metso iCon PORTAL
dB
BladeVan 20.2
BladeVan 20.1
INTERNET
CUSTOMER
Blade-Omat
www.

Fig. 1

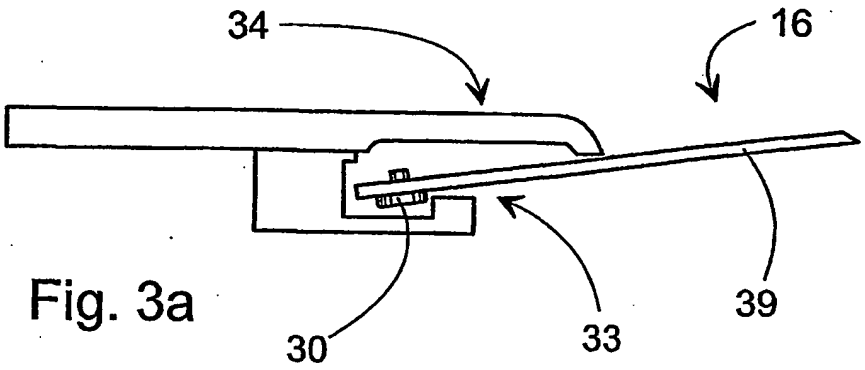

Fig. 3a

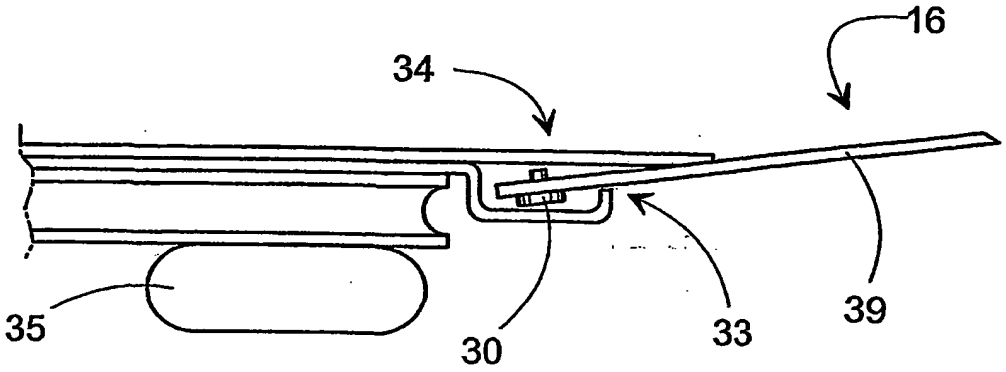

Fig. 3b

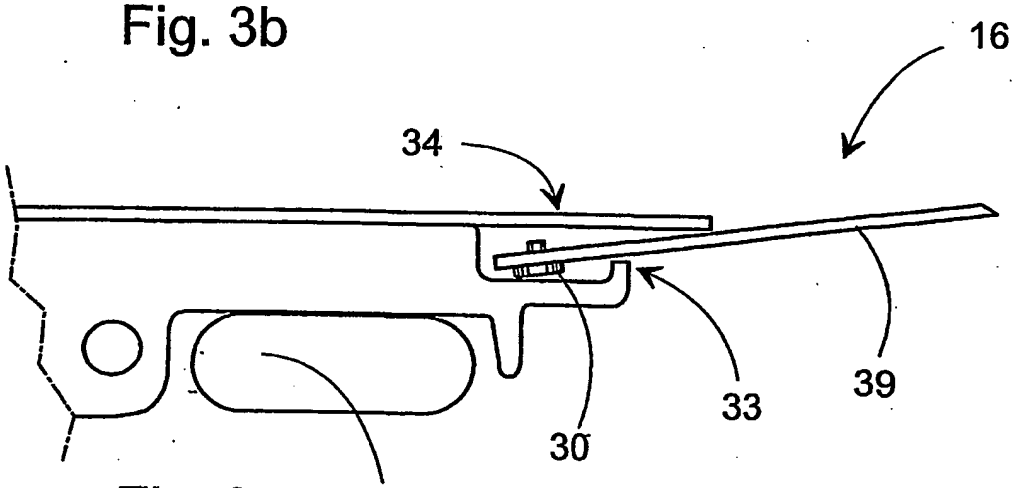

Fig. 3c

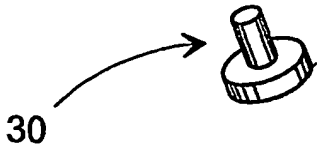

Fig. 2

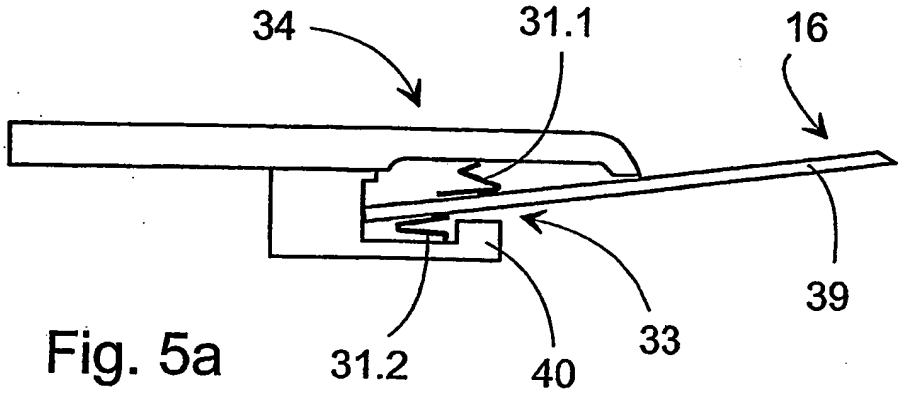

Fig. 5a

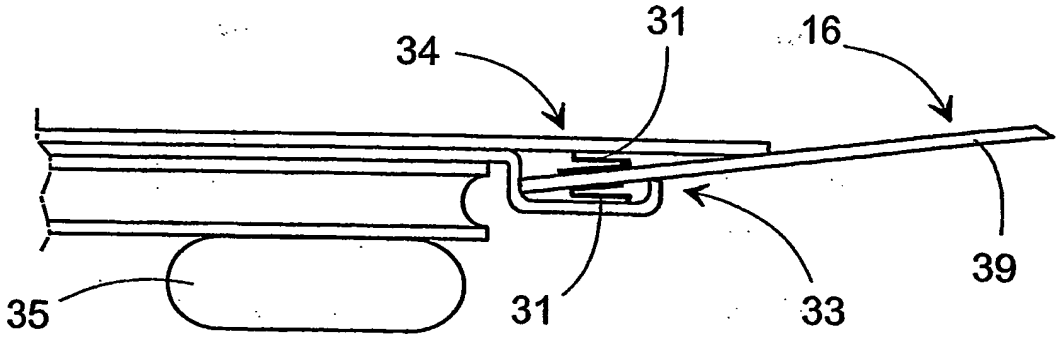

Fig. 5b

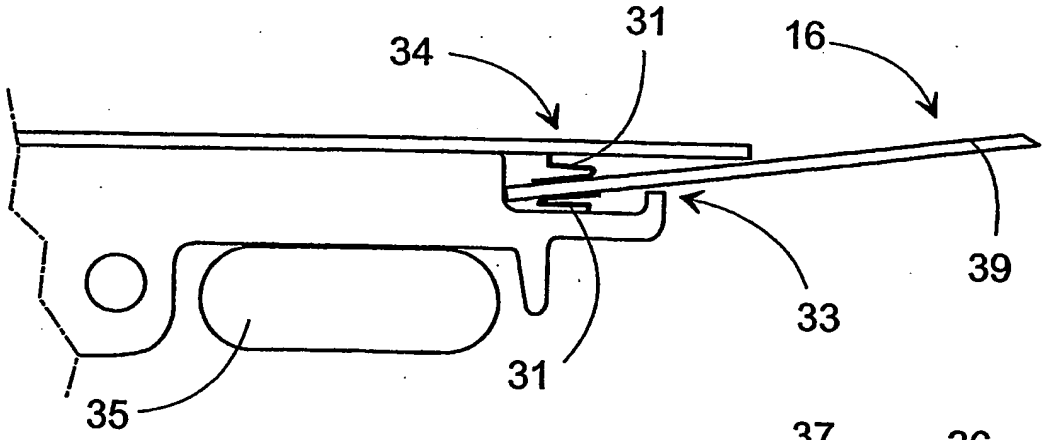

Fig. 5c

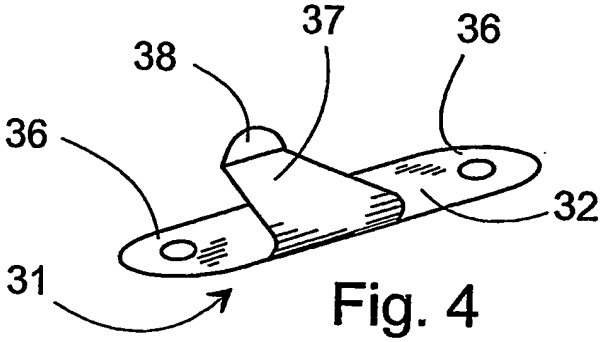

Fig. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 02/00906

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G06F 17/60, D21G 63/00
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G06F, D21G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 0159614 A2 (WEISMAN, S. ET AL), 16 August 2001 (16.08.01), page 7, line 1 - line 7, claims 1,4,6, abstract --	1-22
Y	US 2001035070 A1 (TOIVANEN, H. ET AL), 1 November 2001 (01.11.01), abstract, page 1, [0006] - [0009]; page 1,[0012]; page 2, [0018] - [0021], abstract --	1-21

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
31 March 2003	03 -04- 2003
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Nina Ödling/mj Telephone No. +46 8 782 25 00

Form PCT/ISA/210 (second sheet) (July 1998)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 02/00906

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DATABASE WPI Week 199844 Derwent Publications Ltd., London, GB; Class G06F17/40, AN 1998-518761 abstract & NL 1005264C C2 (KONINK KPN NV), 13 August 1998 (1998-08-13) abstract --	1-7,12-17,22
A	EP 1115080 A2 (GENERAL ELECTRIC CO), 11 July 2001 (11.07.01), abstract, page 1, [0004] --	1-7,12-17,22
A	EP 0467257 A2 (R.J. REYNOLDS TOBACCO CO), 16 July 1992 (16.07.92), column 11, line 45 - column 12, line 35, claim 1, abstract --	1-7,12-17,22
Y	DE 29913598 U1 (VALMET CORP.), 4 November 1999 (04.11.99), figure 1, abstract --	8-10,18-20
Y	US 3778861 A (RONALD F. GOODNOW), 18 December 1973 (18.12.73), figures 1-2, abstract --	11,21
Y	DATABASE WPI Week 199830 Derwent Publications Ltd., London, GB Class T01, AN 1998-338347 & JP JP 10 124585 A (HIROSAWA KIKAI HANBAI KK) 15 May 1998 (1998-05-15) abstract -- --------	22

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI02/00906

Box I **Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II **Observations where unity of invention is lacking (Continuation of item 2 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

see next page

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☒ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

The invention is considered to lack unity à posteriori and to consist of three inventions without common technical features apart from those known in prior art.

The prior art has been defined as WO01/59614 (D1) and US2001/0035070 (D2). D1 describes a system for ordering spare parts via a computer network and D2 describes a machine for finishing doctor blades. The three inventions below share the features of ordering via a computer network. Invention 1 and 2 also share the common features of the spare parts being finished elsewhere than in the factory. However, since there is no common feature in the inventions apart from that of prior art, which can be considered a special technical feature within the meaning of PCT Rule 13.2, no technical relationship between the contents of the claims of the different inventions can be identified. Therefore, the invention lacks unity.

Invention 1 (claims 1-7, 12-16) consists of a system for delivering spare parts ordered via a computer network. Invention 1 is characterised by the fact that the spare parts are ordered via a computer network and that the spare parts are finished elsewhere than at the factory.

Invention 2 (claims 7-11, 17-21) consists of a system for making doctor blades. Invention 2 is characterised by how the doctor blades are finished.

Invention 3 (claim 22) consists of a system for delivering spare parts ordered via a computer network. Invention 3 is characterised by the fact that the spare parts are ordered via a computer network and that the spare parts are stored at the customer's.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/FI 02/00906

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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